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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/779,438	02/13/2004	Colin McCullough	56873US002	8765

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EXAMINER	
SAVAGE, JASON L	

ART UNIT	PAPER NUMBER
1794	

NOTIFICATION DATE	DELIVERY MODE
08/08/2008	ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

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Office Action Summary	Application No.	Applicant(s)	
	10/779,438	MCCULLOUGH ET AL.	
	Examiner	Art Unit	
	JASON L. SAVAGE	1794	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *28 May 2008*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-47* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-47* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claims 1-47 are rejected under 35 U.S.C. 103(a) as being unpatentable over McCullough et al. (US 6,344,270) in view of any one of Ozawa et al (JP 08-176701 English Machine Translation), Shimojima et al (JP 03-071509), Blucher'902 (2003/0029902) or Blucher'538 (2005/0061538).

McCullough teaches a composite wire that includes fiber reinforced metal matrix composites comprising a wire core containing at least one tow comprising a plurality of substantially continuous, longitudinally positioned reinforcing fibers of ceramic or carbon which is encapsulated within a metal matrix (col. 3, ln. 31-45). McCullough also teaches that the wire has a roundness value of at least 0.95, a roundness uniformity value of not greater than 1.5%, and a diameter uniformity value of not greater than 0.5% over a length of at least 100 meters (col. 1, ln. 57 – col. 2, ln. 6). McCullough further exemplifies embodiments wherein the roundness uniformity value is as low 0.94% and the diameter uniformity value of 0.21% (Table 1, runs 12 and 6 respectively). McCullough further teaches that providing wires with uniform properties is desirable in

order to provide beneficial properties when used in cable constructions such as uniform packing and uniform diameter cables (col. 1, ln. 29-36).

Although the prior art does not exemplify embodiments having the claimed properties, it teaches that the claimed properties as being maximum or minimum values with no upper or lower limit boundaries being specified. As such, it would have been obvious to one of ordinary skill in the art to have formed the metal-clad metal matrix composite wire having a roundness uniformity value lower than the 1.5% and a diameter uniformity value lower than the 0.5% including having values within the ranges claimed by Applicant. Furthermore, McCullough exemplifies embodiments having values that are so close that prima facie one skilled in the art would have expected them to have the same properties, Titanium Metals Corporation of America V. Banner, 227 USPQ 773.

Regarding the limitation that a single metal matrix composite wire having an exterior surface to which a metal cladding covers and contacts substantially the entire exterior surface or the metal matrix composite wire core, McCullough does not exemplify an embodiment wherein a the metal matrix composite wire core comprises a metal cladding. However, the use of metal claddings on metal matrix composite wire cores is well known in the art and would have been obvious.

Ozawa teaches a metal matrix composite wire core **10A** comprising at least one tow bundle of continuous fibers **10** positioned within an aluminum metal matrix (Detailed Description of the Invention: Par[0007]). Ozawa further teaches that a covering layer **9** of aluminum is formed on the exterior surface of the metal matrix composite wire core

10A (Detailed Description of the Invention: Par[0008 and 0010]). Ozawa teaches that such a metal covered metal matrix composite wire has good flexural rigidity and is particularly suitable for use as a power transmission line cable (Detailed Description of the Invention: Par[0008 and 0005-0006]).

Shimojima teaches a metal matrix composite wire core **1** comprising at least one tow bundle of long fibers **1a** positioned within an aluminum metal matrix **1b** (Abstract and Figure 3). Shimojima further teaches that a coating layer **4** of aluminum is formed on the exterior surface of the metal matrix composite wire core **1** (Abstract and Figure 6). Shimojima teaches that such a metal coated metal matrix composite wire prevents reduction in tension and flexibility of a power transmission line cable (Abstract).

Blucher'902 teaches a metal matrix composite wire core **58** comprising at least one tow bundle of long fibers positioned within an aluminum metal matrix having a cladding **50** formed on the exterior surface of the metal matrix composite wire core **58** (par [0046] and Figure 10). Blucher'902 teaches that such a metal clad metal matrix composite wire shows improved handling characteristics to similar wires which are not clad (par[0044]).

Blucher'538 teaches a metal matrix composite wire core **10** comprising at least one tow bundle of long fibers **12** positioned within an aluminum metal matrix **14** having a clad jacket **16** formed on the exterior surface of the metal matrix composite wire core **10** (par [0015, 0017-0018] and Figures 1-2). Blucher'538 further teaches that such a clad jacketed metal matrix composite wire exhibits considerable weight savings over

existing power transmission cables, relatively high strength and a low coefficient of thermal expansion (par[00020]).

It would have been obvious to one of ordinary skill in the art to have applied a clad coating to the exterior surface of the metal matrix composite wire core of McCullough with a reasonable expectation of success since it is well known in the art to do so such as demonstrated by Ozawa, Shimojima, Blucher'902 and Blucher'538. One of ordinary skill in the art would have been motivated to have applied such a cladding coating to the wire core to form a composite having good flexural rigidity, improved handling characteristics, considerable weight savings, relatively high strength and/or a low coefficient of thermal expansion such as would be beneficial for power transmission lines

In response to the issue whether the reference is nonanalagous art, it has been held that the determination that a reference is from a nonanalogous art is twofold. First, one decides if the reference is within the field of the inventor's endeavor. If it is not, one proceeds to determine whether the reference is reasonably pertinent to the particular problem with which the inventor was involved, In re Wood, 202 USPQ 171, 174. In the instant case, the references of McCullough, Ozawa Shimojima, Blucher'902 and Blucher'538 are generally drawn to forming composite wires or cables that include a wire core containing a plurality of fibers embedded in an aluminum matrix.

Regarding the limitation that the clad single metal matrix composite wire have the recited roundness, roundness uniformity and diameter uniformity values, it would have been obvious to one of ordinary skill to have insured the single metal matrix composite

wire of McCullough modified by forming a cladding on the surface of the wire would still have the same roundness, roundness uniformity and diameter uniformity as taught by McCullough. One would have been motivated to have insured the clad wire have similar properties so that it will provide beneficial properties when used in cable constructions such as uniform packing and uniform diameter cables.

Regarding claim 25, McCullough teaches what is set forth above but does not exemplify an embodiment wherein the roundness value is at least 0.98. However, as was set forth above, since McCullough only teaches the minimum value for the roundness value of being at least 0.95, higher values including that claimed by Applicant would have been obvious.

Regarding claims 2 and 26, McCullough teaches embodiments comprising multiple tows (Figure 4). Furthermore, McCullough teaches the composite wire or cable typically contains a plurality of tows (col. 1, ln. 40-48).

Regarding claims 3-4 and 27-28, since McCullough as modified by the prior art teaches the same wire structure as that claimed by Applicant including having a metal cladding covering, the wire of McCullough would be just as plastically deformable and just as effective to dampen recoil effects to prevent secondary fractures and the as the wire claimed by Applicant.

Regarding claims 5 and 29, the clad wire of McCullough would exhibit a larger strain to failure as compared to the strain to failure exhibited by an unclad wire.

Regarding claims 6-8 and 30-31, McCullough teaches the matrix material may be aluminum, zinc, tin and alloys thereof and further teaches that the matrix material is preferably aluminum having a purity of greater than 99.95% by weight (col. 6, ln. 1-16).

Regarding claims 9-13 and 32-36, McCullough is silent to the material used to form the metal cladding. However, it would have been within the purview of one of ordinary skill in the art to have recognized what materials could suitably be used to clad the wire. Given the teaching that the matrix material is preferably pure aluminum, it would have been obvious to have used high purity aluminum as the metal cladding as well with a reasonable expectation of success. A cladding of aluminum would meet the claim limitations of having a melting point less than 700 C.

Regarding claims 14 and 37, McCullough is silent to the cladding thickness. However it would have been within the purview of one of ordinary skill in the art at the time of the invention to have determined the thickness of the cladding layer that would be necessary in order to maintain the wires in the core in a stranded configuration (col. 9, ln. 32-38). Absent a teaching of the criticality or showing of unexpected results due to the claimed thickness, it would not provide a patentable distinction over the prior art.

Regarding claims 15 and 38, McCullough teaches that at least 85% of the wires in the tow are continuous (col. 3, ln. 31-44).

Regarding claims 16 and 39, McCullough teaches the core comprise between 30 to about 70 volume % of fibers and preferably between 40 to 60 volume % of fibers (col. 5, ln. 45-53).

Regarding claims 17-19 and 40-42, McCullough teaches the fibers are ceramic oxide fibers such as polycrystalline alpha alumina based fibers wherein the fibers comprise at least 99 percent by weight of alumina (col. 4, ln. 17-31).

Regarding claims 20-24 and 43-47, McCullough teaches a plurality of the metal clad composite wires may be helically stranded to form a permanently set cable and that the cable may also include core and shell structure comprising a shell of secondary aluminum wires (col. 8, ln. 52-68).

Response to Arguments

Applicant's arguments filed 5-28-08 have been fully considered but they are not persuasive.

Applicant argues the McCullough does not teach a single metal matrix composite wire having a metal cladding covering and contacting substantially the entire exterior surface of the wire. The Examiner concedes that there is no teaching of forming a metal cladding on a single wire; however as demonstrated in the rejection above, it is well known to provide metal claddings on single metal matrix composite wires to provide beneficial properties such having good flexural rigidity, improved handling characteristics, considerable weight savings, relatively high strength and/or a low coefficient of thermal expansion such as would be beneficial for power transmission lines. As such, the limitation of forming a metal cladding on the wire is considered obvious. Absent a teaching of the criticality or showing of unexpected results when a

single metal matrix composite wire is clad, it would not provide a patentable distinction over the prior art.

Applicant further argues that the Patent Office's reliance on McCullough for a disclosure, teaching, or suggestion of Applicant's claimed roundness value and roundness uniformity value over a length of 100 meters is improper. Applicant asserts that the reliance is improper since McCullough does not disclose a single composite wire having a metal cladding having the claimed roundness value and related uniformity parameters. However, the prior art teaches that the formation of a metal cladding on a single composite metal matrix wire is known. McCullough teaches that composite wires having uniform parameters such as roundness, roundness uniformity and diameter uniformity is desirable so as to provide cable constructions that are more uniformly packed and having more uniform diameters (col. 1, ln. 29-36). As such, it would have been obvious to have insured the metal clad wire of McCullough as modified by the prior art had uniform parameters such as taught by McCullough so as to form cables having uniform packing and diameters.

Applicant further argues that the Patent Office has not shown that, absent Applicant's own disclosure, such desirable characteristics such as stated above would necessarily result. However, to provide a proper case of *prima facie* obviousness, the Office need not show that the stated properties necessarily result, only that there would be a reasonable expectation for success. Furthermore, this argument is not commensurate in scope with the claims as there are no limitations in Applicant's claims

drawn to the properties recited in the prior art which may be improved by employing a cladding.

Applicant further argues that the Patent Office's rejection to the claims has been formulated by improper and unwitting application of hindsight for the references contain no suggestion for combining and practicing the selected teaching thereof in a way that necessarily yield, or is reasonably likely to result in Applicant's claimed invention.

In response to applicant's argument that the examiner's conclusion of obviousness is based upon improper hindsight reasoning, it must be recognized that any judgment on obviousness is in a sense necessarily a reconstruction based upon hindsight reasoning. But so long as it takes into account only knowledge which was within the level of ordinary skill at the time the claimed invention was made, and does not include knowledge gleaned only from the applicant's disclosure, such a reconstruction is proper. See *In re McLaughlin*, 443 F.2d 1392, 170 USPQ 209 (CCPA 1971). Since both the use of clad metal matrix composite wires is known and providing metal matrix composite wires having uniform parameters as claimed is known, the combination takes into account only knowledge which was known and within the level of ordinary skill at the time the claimed invention was made.

Conclusion

THIS ACTION IS MADE FINAL. Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to JASON L. SAVAGE whose telephone number is (571)272-1542. The examiner can normally be reached on M-F 6:30-4:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Keith Hendricks can be reached on 571-272-1401. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

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7-28-08

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